

**PHOENIX-GOODYEAR AIRPORT AREA SUPERFUND SITE**

AR0008

**EXPLANATION OF SIGNIFICANT DIFFERENCES #3**

**for the FINAL REMEDY RECORD OF DECISION**

**December 1995**

**I. INTRODUCTION**

On September 26, 1989, the United States Environmental Protection Agency (EPA) signed a Record of Decision (ROD) for the final remedy at the Phoenix-Goodyear Airport (PGA) site in Goodyear, Arizona. The State of Arizona concurred with the remedy selected in the 1989 ROD. In January 1991, EPA issued an Explanation of Significant Difference (ESD #1) which modified and clarified the 1989 ROD on five points. In May 1993, EPA modified the ROD a second time to explain the differences between the final remedy originally selected in the 1989 ROD and the final remedy which will be implemented at the site (ESD #2). EPA is now modifying the ROD a third time to explain further differences between the final remedy selected in 1989 and the remedy currently being implemented at the site. These changes are not fundamental alterations of the remedy described in the 1989 ROD.

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986, and pursuant to 40 C.F.R. Section 300.435(c)(2)(i) (55 Fed. Reg. 8666, 8852 (March 8, 1990)), EPA is required to publish an ESD when significant (but not fundamental) changes are being considered to a final remedial action plan as described in a ROD. If the changes fundamentally alter the nature of the selected remedy, an amendment to the ROD would be required [40 C.F.R. Section 300.435(c)(2)(ii)]. In this instance, EPA has made a few important changes that modify the ROD requirements, but do not alter the hazardous waste management approach that EPA selected in the ROD. The changes will

enhance the effectiveness of the remedy, and promote more effective cleanup of the site. The purpose for each of these changes is described in detail in Section III of this document.

This document provides a brief background of the site, a summary of the remedy selected in the 1989 ROD and how that remedy was modified by the 1991 and 1993 ESDs, a description of how this ESD affects the remedy originally selected by EPA in the 1989 ROD, and an explanation of why EPA is making these changes to the ROD. EPA is issuing this third ESD to the 1989 ROD in order to take into account information received by EPA after EPA's issuance of the 1991 and 1993 ESDs.

The southern portion of the site consists of the Loral Defense Systems-Arizona (Loral) property and the Phoenix-Goodyear Airport property and any groundwater contamination emanating from these areas. The northern portion of the site consists of the Unidynamics property and any groundwater contamination emanating from these areas. This ESD proposes to modify the remedy selected for the site as follows:

- (1) modify the groundwater remedy for Subunit A groundwater to allow air sparging of Subunit A groundwater in areas where a soil vapor extraction system can collect and treat the volatile organic compound (VOC) vapors emitted by the air sparging system in a manner consistent with the ROD; and

- (2) modify the groundwater remedy for Subunit A groundwater to include use of a metal adsorption wellhead treatment system, where appropriate, for wells connected to the existing groundwater treatment plant. This system would be used at any Subunit A groundwater remedy extraction well with chromium contamination that, without such a system, would result in the effluent at the Subunit A groundwater treatment plant exceeding site clean-up standards for metal contaminants.

This ESD modifies the remedy selected in the ROD for both the northern and the southern portion of the PGA site, but will initially be implemented only at the southern portion of the site. EPA will evaluate the effectiveness of air sparging at PGA-south before deciding whether to implement air sparging at PGA-north. Currently chromium is a contaminant of concern at PGA-south but not at PGA-north; accordingly, metal adsorption wellhead treatment is not anticipated at PGA-north at this time.

This ESD and supporting documentation will become part of the PGA Administrative Record. Copies of the Administrative Record for the PGA site (including this ESD) have been placed at the following locations:

Avondale Public Library  
328 West Western Avenue  
Avondale, Arizona 85323  
(602) 932-9415

EPA Region 9 Superfund Records Center  
95 Hawthorne Street - 4th floor  
San Francisco, California 94105  
(415) 536-2000

EPA provided a fifteen (15) working day comment period for the State of Arizona in accordance with 40 C.F.R. Section 300.515(h)(3). State of Arizona comments on this ESD are summarized in Section IV of this document and are also included in the PGA Administrative Record file. Pursuant to 40 C.F.R. Section 300.435(c)(2)(i), EPA will publish a notice summarizing this ESD in a major newspaper of general circulation. A formal public comment period is not required for an ESD.

## **II. BACKGROUND**

The following provides a brief background of the PGA site, short summaries of the remedy selected in the original 1989 ROD and changes to the 1989 ROD established by the 1991 and 1993 ESDs. Additional background information can be found in the 1989 ROD, the 1991 ESD, the 1993 ESD, and in the PGA Administrative Record.

### **A. Site Background and Description**

The PGA site is located primarily in Goodyear, Arizona, approximately seventeen (17) miles west of Phoenix in the western part of the Salt River Valley. A groundwater flow divide splits the site along Yuma Road into northern and southern portions. The northern portion of the site consists of the Unidynamics property, located at 102 S. Litchfield Road and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Unidynamics property. The southern portion of the site consists of the Loral Defense Systems property located at 1300 S. Litchfield Road, the PGA property, and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Loral and/or PGA properties. Attachment #1 provides a map indicating the approximate site boundaries of the Phoenix-Goodyear Airport Superfund site. The current land uses on and near the site are agricultural, industrial, and residential.

In 1981, the Arizona Department of Health Services (ADHS) discovered that groundwater in certain areas of the site was contaminated with solvents and chromium. EPA and ADHS conducted additional sampling of wells in 1982 and 1983 which revealed eighteen (18) wells contaminated with trichloroethylene (TCE). As a result, EPA added the PGA site (originally listed as the "Litchfield Airport Area Superfund Site") to the National Priorities List (NPL) on September 8, 1983 (see Federal Register, Vol. 48, No. 175, p. 40671). Other hazardous substances found at the PGA site include acetone, methyl ethyl ketone (MEK),

1,1,1-trichloroethane (TCA), 1,1-dichloroethylene (DCE), other volatile organic compounds (VOCs), and chromium.

Most of the groundwater and soil contamination in the southern portion of the site is located within the Loral and airport properties inside an area of the site designated as Section 16. Contaminated "shallow groundwater" (hereafter referred to as Subunit A groundwater) within Section 16 was addressed in the first phase of the remedy for the PGA Superfund site and is referred to as the Section 16 Operable Unit. A Record of Decision for the Section 16 Operable Unit was signed on September 29, 1987. The designated remedy of a pump and treat system for Subunit A groundwater has been operating since December 1989. A primary objective of the Section 16 Operable Unit is to protect human health and the environment by preventing the migration of contaminated groundwater and resulting aquifer degradation.

Groundwater currently used for drinking water in the area of the site meets federal and state drinking water standards. However, because municipal water supplies in the area of the site are dependent on groundwater, future population growth in the area could require use of groundwater in contaminated areas and may result in potential exposure to hazardous substances.

The clean-up work in the northern portion of the site is being carried out by Unidynamics, whereas the Goodyear Tire & Rubber Company is the lead party implementing the work in the southern portion of the site. EPA, with the assistance of the Arizona Department of Environmental Quality (ADEQ), authorizes and oversees all clean-up activities at this Superfund site.

#### **B. Remedy Selected in the 1989 ROD**

The ROD for the final remedy at the PGA Site was signed by the EPA Regional Administrator on September 26, 1989. In addition to selecting the remedial actions described

below, the final remedy also incorporates the Section 16 Operable Unit. The groundwater clean-up levels for the PGA site are identified in Table 2-5 of the ROD<sup>1</sup>. The groundwater cleanup levels for the Section 16 Operable Unit are identified in Table 2-5 and in Table 1 of the 1987 ROD.

### **ROD Remedy for Southern Portion of PGA Site**

For the southern half of the site, the remedy consists of extraction and treatment of contaminated Subunit A groundwater and "deep groundwater" (hereafter referred to as Subunit B/C groundwater) and soil vapor extraction for contaminated soils. The Subunit A groundwater and the Subunit B/C groundwater remedial actions require a pump and treat system using air stripping to remove VOCs from the groundwater. The ROD states that groundwater remedial action shall consist of three (3) new Subunit B/C groundwater wells for extraction and treatment of Subunit B/C groundwater at a central treatment plant. The ROD states that the central treatment plant may be operated without emissions controls as long as compliance with Federal, State, and local air pollution regulations can be maintained. In addition, the ROD requires that treated water from the central treatment plant will be made available to the City of Goodyear for municipal use. The estimated total present worth cost of the extraction and treatment facilities for the groundwater remedy for the southern portion of the site is \$14,500,000.

With respect to VOC soil contamination at the southern portion of the PGA site, the ROD selected a soil vapor extraction (SVE) system with emission controls. The SVE system is being implemented in certain required areas within an area identified as Target Area 2 in

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<sup>1</sup> The groundwater cleanup levels in Table 2-5 of the ROD consist of: a) Federal and State of Arizona legally Applicable or Relevant and Appropriate Requirements (ARARs); and, b) other criteria used to ensure the protectiveness of the remedy (known as To Be Considered (TBCs)).

Figure 5-2 of the ROD. The total present worth cost of the soil remedy for the southern portion of the site is estimated to be \$3,900,000 for a phased implementation.

#### **ROD Remedy for Northern Portion of the PGA Site**

The remedial action selected for the northern portion of the site is similar to that chosen for the south and includes a Subunit A groundwater remedy, a Subunit C groundwater remedy, and a soil remedy. The Subunit A groundwater remedy consists of a pump and treat system using air stripping, followed by liquid phase granular activated carbon. Vapor-phase GAC air emission controls are required for the Subunit A groundwater remedy. The ROD requires that the treated water from Subunit A groundwater remedy be reinjected, and the treated water from the Subunit C groundwater remedy be incorporated into the community water supply. The estimated present worth cost of the groundwater remedy for the northern portion of the site is \$14,000,000.

The soil remedy consists of a SVE system with vapor-phase GAC air emission controls to be implemented in the target area. The ROD identifies the target area as that area where VOCs were detected in soil samples and the area where soil gas samples exhibited VOCs greater than 1 microgram per liter. The ROD provides that this area may be expanded or reduced, as necessary, to include removal of 99 percent of the contaminants. In addition, the ROD states that excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective. The estimated present worth cost of the SVE system is \$3,100,000.

#### **C. The 1991 ESD changes to the 1989 ROD**

The ESD issued by EPA in January 1991 clarified and modified portions of EPA's September 1989 ROD. To the extent that the 1991 ESD differed from the ROD, the 1991 ESD supersedes the ROD. The 1991 ESD modified the ROD as follows:

(1) The 1991 ESD revised the clean-up level for methyl ethyl ketone (MEK) in groundwater from 170 parts per billion (ppb) to 350 ppb;

(2) The 1991 ESD set a clean-up level for acetone in groundwater at 700 ppb;

(3) The 1991 ESD clarified the target area for the soil remedy in the northern portion of the site and the criteria for establishing the clean-up levels. On page four of the 1989 ROD, the soil remedy target area is described as "that area where VOCs were detected in soil samples and the area where soil gas samples quantified VOCs greater than 1 microgram per liter. The area may be expanded or reduced to include removal of 99 percent of the contaminant." In the 1991 ESD, EPA defined these statements to identify the soil remedy target area for the northern portion of the PGA site to consist of target areas B and C defined by all four circles in Figure 5-7 of the 1989 ROD;

(4) The 1991 ESD clarified the role of soil excavation as a remedy option, should the selected soil remedy (soil vapor extraction) at the northern portion of the site prove ineffective. The 1989 ROD states on page four that "excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective." In the 1991 ESD, EPA interpreted this to mean that excavation and treatment of soil is one, but not the only, remedial alternative EPA will consider for the soil in the northern portion of the site if soil vapor extraction is ineffective; and

(5) The 1991 ESD revised the selected remedy for an off-site agricultural well referred to as the "Phillips Well" from wellhead treatment to routine water quality monitoring. The 1991 ESD did not alter EPA authority to reimpose the requirement for wellhead treatment at the Phillips Well should future monitoring indicate that the concentration of any VOC has exceeded the clean-up level identified in Table 2-5 of the 1989 ROD. EPA's decision to



reimpose wellhead treatment will be based on the Agency's review of water quality sampling results for the Phillips well.

#### **D. The 1993 ESD Changes to the 1989 ROD**

The ESD issued by EPA in April 1993 further modified portions of EPA's September 1989 ROD. To the extent that the April 1993 ESD differed from the ROD, the 1993 ESD supersedes the ROD.

The April 1993 ESD modified the selected remedy in the ROD for the northern portion of the site as follows:

(1) changed the emission control technology for the Soil Vapor Extraction System from vapor-phase granular activated carbon (GAC) to treatment by thermal oxidation with wet scrubbing;

(2) changed the designated end use for water treated by the Subunit C groundwater remedy from incorporation into the community potable water supply to reinjection back into the Subunit C section of the aquifer<sup>2</sup>; and

(3) suspended the remedial design and construction of the liquid-phase GAC treatment requirement (or other similar effective technology) from the Subunit A groundwater remedy until treatment plant influent data quality indicates the presence of a lower volatile compound (e.g. ketones) at a concentration of 50% or more of its site groundwater cleanup standard.

The April 1993 ESD modified the remedy selected for the southern portion of the site as follows:

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<sup>2</sup> An explanation of when municipal end-use may still be considered is explained in Section III.E of the 1993 ESD.

(1) changed the requirement for a centralized air stripping system for the Subunit B/C groundwater remedy to a decentralized system (e.g., two or more independent liquid-phase GAC treatment systems);

(2) changed the designated end use for water treated by the Subunit B/C groundwater remedy from municipal use to reinjection back into the Subunit B/C section of the aquifer<sup>3</sup>;

The April 1993 ESD modified the selected remedy in the ROD for both portions of the site as follows:

(1) added the requirement that should any private or municipal drinking water well in the vicinity of the PGA site, including but not limited to City of Goodyear wells number 1, 2, 3, 7, 10, 11 and the Parkshadows drinking water well, have an occurrence of a contaminant listed in Table 2-5 of the ROD in a concentration in excess of its groundwater clean-up standard and such contamination is related to contamination in the Unidynamics or airport areas, such drinking water well(s) shall be treated as soon as possible by wellhead liquid-phase GAC treatment or other similar technology as approved by EPA.

(2) established four additional groundwater clean-up standards for Table 2-5 of the ROD as follows:

Benzene - 5 parts per billion (ppb)

Ethylbenzene - 700 ppb

1,1,2,2 Tetrachloroethane - 0.18 ppb

Tetrachloroethene - 5 ppb

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<sup>3</sup> same as footnote 2.

### **III. MODIFICATIONS TO THE ROD REMEDY**

#### **A. Air Sparging**

This ESD modifies the groundwater remedy for Subunit A groundwater to allow air sparging of Subunit A groundwater. Air Sparging technology acts to transfer liquid-phase VOC groundwater contamination to vapor-phase VOC in unsaturated soils lying above the groundwater which can then be easily removed by a SVE system. Successfully implemented, air sparging can accelerate the removal of VOCs from the groundwater and reduce the time needed for restoration of the aquifer. Air sparging will only be allowed to operate in Subunit A groundwater in areas where an overlying soil vapor extraction system can collect and treat the VOC vapors emitted by the air sparging system. The overlying SVE system must treat all collected VOC vapors in a manner allowed by and consistent with the ROD.

An air sparging system works in the following manner: (a) air sparging wells introduce contaminant-free air bubbles into groundwater contaminated with VOCs; (b) the sparged air bubbles force the transfer of VOCs dissolved in groundwater (or VOCs sorbed on soil particles in the groundwater zone) into the sparged air bubbles themselves due to the preference of VOCs for the vapor phase; (c) the sparged air bubbles naturally rise to the top of the groundwater, collecting VOCs along the way, until the bubbles leave the groundwater and enter into pore spaces in the unsaturated soils lying above the groundwater; and (d) the vapor-phase VOC contamination in the pore spaces of the unsaturated soils is then vacuumed and removed from the soils by SVE wells for subsequent treatment. Successful application of air sparging technology would lead to an acceleration of VOC mass removal and ultimate cleanup of Subunit A groundwater.

Given the fact that cost per pound of VOCs removed from the groundwater via pump and treat technology is considerably higher than the cost of air sparging plus SVE, EPA has

concluded that air sparging is a cost-effective technology when applied appropriately. In December 1994, with EPA approval, Goodyear Tire & Rubber Company conducted a pilot test of air sparging technology at PGA-south (Reference 1). The pilot test results indicated that air sparging could effectively accelerate the Subunit A groundwater cleanup. By a project summary document dated September 1992 (EPA/600/SR-92/173), EPA studies of this technology indicate that air sparging may make it possible to substantially decrease the time required to achieve site closure (Reference 2). The estimated cost of this component of the ESD at PGA-south is \$131,800. The estimated cost of this component has not yet been evaluated for PGA-north. It is anticipated that by accelerating the groundwater cleanup, the overall cost of groundwater cleanup will be significantly reduced.

#### **B. Metal Adsorption**

In addition, this ESD modifies the groundwater remedy for Subunit A groundwater to include the use of a metal adsorption treatment system at certain Subunit A groundwater remedy extraction wells. This system is required at any Subunit A groundwater remedy extraction well with chromium contamination that, without such a system, would result in the effluent at the Subunit A groundwater treatment plant exceeding site clean-up standards for metal contaminants. Adsorption systems like those employing Granular Activated Carbon (GAC) are a common treatment technology for groundwater cleanup with VOCs. As explained above, pursuant to ESD #2, GAC was made part of the ROD remedy for Subunit B/C groundwater at PGA-south. By document dated June 1992, EPA issued a June 1992 fact sheet providing basic information regarding GAC (Reference 3). GAC and other support media can be manufactured to be "ion-specific," which means that certain metal contaminants will be especially attracted to and adsorbed onto the media. This ESD allows the use of metal adsorption systems at the wellheads of certain Subunit A remedy extraction wells that meet

the above-described conditions. With EPA approval, Goodyear Tire & Rubber Company conducted a treatability study in November 1994 of groundwater extracted by Subunit A remedy well E-17 by two metal adsorption technologies: one using chromium-specific treated GAC and one using chromium-specific treated media known as N-Tech Advanced Affinity Chromatography (References 4 and 5). These treatability studies concluded that either chromium-specific treated media would effectively remove chromium from chromium contaminated Subunit A groundwater at PGA-south (Reference 6). The estimated cost of this component of the ESD for implementation at PGA-south is \$142,000.

#### **IV. SUPPORT AGENCY COMMENTS**

The Arizona Department of Environmental Quality (ADEQ) and the Arizona Department of Water Resources (ADWR) reviewed and concurred with this ESD. Both ADWR and ADEQ considered the ESD to be an adequate document and submitted no comments.

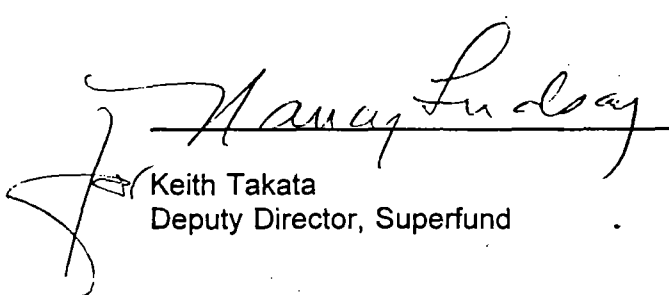
#### **V. STATUTORY DETERMINATIONS**

Considering the new information that has been developed and the changes made to the selected remedy upon implementation of this ESD, EPA believes that the remedy for the PGA site will remain protective of human health and the environment, will continue to comply with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and will continue to be cost-effective. In addition, the revised remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. Some of the changes and clarifications contained in this ESD are significant, but none of the proposed changes fundamentally change the remedy. EPA also believes these

modifications to the remedy will be cost effective, accelerating the clean-up and restoration of the groundwater at PGA.

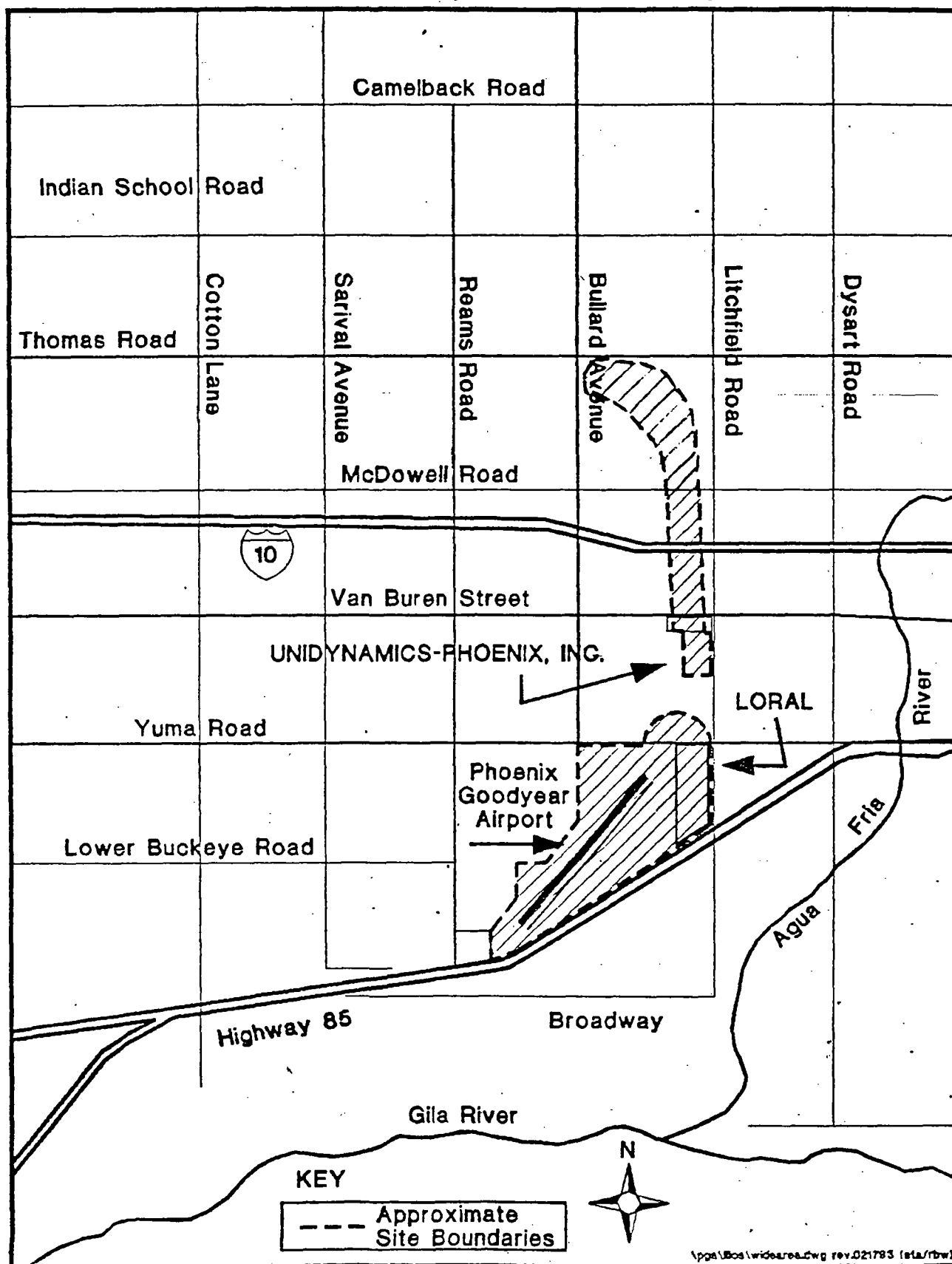
## VI. PUBLIC PARTICIPATION ACTIVITIES

EPA has presented these changes to the remedy in the form of an ESD because the changes are of a significant but not fundamental nature. EPA provided the State of Arizona with a fifteen (15) day comment period on this ESD. In accordance with Section 117(c) of CERCLA, 42 U.S.C. Section 9617, EPA will publish a notice in the *Arizona Republic* and the *West Valley View* newspapers which describes this ESD and its availability for review. In accordance with 40 C.F.R. Section 300.435(c)(2)(ii), this ESD and all documents that support the changes and clarifications herein will be contained in the Administrative Record for the PGA site prior to the commencement of the remedial actions affected by the final ESD.

  
Keith Takata  
Deputy Director, Superfund

12/22/95  
Date

# Approximate Boundaries of Phoenix Goodyear Airport Area Superfund Site



1ppa\Bos\widearea.dwg rev.021783 (eta/rbw)

## ATTACHMENT 2

### Index of References

1. *Phoenix-Goodyear Airport (South) Subunit A Groundwater Remedy Acceleration – Air Sparging*, Scott Zachary, Metcalf & Eddy, May 1, 1995
2. *Project Summary: A Technology Assessment of Soil Vapor Extraction and Air Sparging*, US EPA RREL, EPA/600/SR-92/173, September 1992
3. *EPA Facts About Activated Carbon Treatment*, US EPA, June 1992
4. "New Activated Carbon Technology Recovers Heavy Metals", Tom Lewis III, *Industrial Wastewater*, July/August 1994
5. *Advanced Affinity Chromatography*, NTEC Solutions, Inc.
6. *Chromium Removal Options for Well E-17 – Phoenix-Goodyear Airport*, Goodyear, Arizona, Sharp & Associates via fax, May 2, 1995